Hot-Rolled MSH Sections for Mechanical Engineering and Civil Construction

A step ahead in quality

We’ll be sending you copies from existing stocks until the revised version is available.
The most important advantages of MSH

At a glance

3 Back-up you can rely on: **EN 10210** guarantees numerous technical advantages of hot-rolled MSH sections

5 **A large range of sizes and extra-long mill lengths** – the standard manufacturing programme alone provides approx. 740 circular, 225 square and 450 rectangular MSH sizes in lengths of up to 16 m

6 **A wide range of steel grades** for the most varied applications, from carbon structural steels and high-strength special steels right up to quenched-and-tempered fine-grain structural steels

8 **Proven quality** based on numerous and international certifications

9 **Visual appeal** through clear, smooth lines and aesthetically pleasing structures without sharp edges and exposed welds

10 **High static load capacity** of square and rectangular MSH sections thanks to small corner radii

11 **Optimum buckling load capacity** reflected by a highly favourable buckling stress curve

14 **Unrestricted weldability** even in the corner zones of square and rectangular MSH sections

16 **Structural safety and reliability** through uniform hardness distribution and low residual stresses ensured by the hot-rolling process

18 **High notch toughness** makes MSH sections optimally suited to low-temperature applications

20 **Excellent processing and fabrication characteristics** through small corner radii and large, flat connecting areas in square and rectangular MSH sections

21 Hot-rolled MSH sections – pleasing to the eye and the budget through outstanding **cost-effectiveness**

22 And, finally, the **comprehensive know-how** available to our customers in more ways than one: Consulting, Brochures, Software, Internet, Hotline
Hot-rolled MSH sections to EN 10210: numerous technical advantages

Hot-rolled circular, square and rectangular Mannesmann Structural Hollow Sections – MSH sections, for short – have been used successfully for several decades. Modern steel architecture, with its elegant and transparent forms, would be practically impossible to create without them. But the use of MSH sections is by no means limited to building construction: they have firmly established themselves in industrial and bridge construction as well as in the construction of sports facilities. In addition, mechanical engineering appreciates the benefits of hot-rolled MSH sections, as shown by numerous examples of agricultural equipment, materials handling systems, ship-building and fun-fair facilities.

It goes without saying that MSH sections meet all relevant requirements specific to these applications, in terms of their mechanical, technological and geometrical properties. In many cases, we can even fulfil and warrant customer specifications that far exceed the requirements laid down in the applicable standard.

Hot-rolled MSH sections are formed into their final shape at normalising temperature (about 900 °C), cold-formed hollow sections at room temperature.

Thus, there are significant differences between the properties of hot and cold-formed hollow sections. European standards take account of these differences by way of separate delivery conditions and dimensioning requirements (e.g. Eurocode 3).

Designers and users should be informed about this. The applicable standard, e.g. EN 10210, must therefore be specified for all projects and deliveries.

Stress-strain calculations, tendering specifications and workshop drawings should always specify the product to be used – hot-rolled MSH sections in accordance with EN 10210 – as well as the desired mill certificate. Further information on this point is included in our MSH publication “Technical Information 1”.

It is possible in all cases to use hot-rolled instead of cold-formed hollow sections. However, where design calculations are based on hot-rolled hollow sections, only the use of these sections can ensure problem-free construction. By using hot-rolled MSH sections you will always be on the safe side. This brochure provides a useful overview and also points out the differences between hot-rolled and cold-formed hollow sections.
A large range of sizes and extra-long mill lengths

<table>
<thead>
<tr>
<th></th>
<th>Circular</th>
<th>Square</th>
<th>Rectangular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside diameter</td>
<td>21.3 mm to 660 mm</td>
<td>40 x 40 mm to 400 x 400 mm</td>
<td>50 x 30 mm to 500 x 300 mm</td>
</tr>
<tr>
<td>Wall thickness</td>
<td>2.3 mm to 100 mm</td>
<td>max. 25 mm*</td>
<td>max. 25 mm*</td>
</tr>
<tr>
<td>Possible combinations</td>
<td>740</td>
<td>225</td>
<td>450</td>
</tr>
<tr>
<td>complete</td>
<td>1415</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*) All available dimensions listed in the brochure “Technical Information No. 1”

**MSH sections – Over 1,400 sizes in lengths of up to 16 m**

For special applications, circular MSH sections can even be manufactured with outside diameters of up to 1,500 mm and wall thicknesses of up to 270 mm. At 25 mm, the maximum wall thickness of hot-rolled square and rectangular MSH sections is significantly greater than in cold-formed hollow sections.

Design engineers can thus choose the optimum structural hollow sections for each application from the world’s largest range of sizes – the MSH manufacturing programme of V & M TUBES. Where tremendous loads have to be supported and transmitted in restricted space conditions, an MSH section with an appropriately large wall thickness can be chosen. Conversely, where crucial design calculations have to be carried out – for example, to minimise a structure’s deadweight – a suitable intermediate dimension can be specified for MSH sections, provided the number of sections required constitutes a reasonable rolling lot. V & M TUBES supplies MSH sections in standard lengths of up to 12 m. This length can be handled comfortably in transportation and storage. For special cases, requiring a reduction in the number of structural elements and hence butt welds, greater mill lengths of up to 16 m are available.

These extra-long mill lengths are subject to certain manufacturing restrictions, especially where wall thicknesses of approximately 25 mm and greater are involved. The most commonly used sizes are marked in our manufacturing programme, enabling users to recognise which sizes are available at short notice from stockists and traders.
Steel grades

MSH sections – The optimum steel grade for each application

The preferred steel grade held by stockists is the standard grade S355J2H in accordance with EN 10210. But hot-rolled MSH sections can also be manufactured using a wide range of other steel grades. In addition to general structural steels, these include high-strength fine-grain structural steels and special grades. For special applications, MSH sections can even be made in non-weldable steel grades (e.g. C45E), thanks to the seamless tube production process. This gives design engineers the freedom to choose the best-suited steel grade for the application at hand.

Grade portfolio Industry division

V & M TUBES for standard grades

V & M TUBES specific branded grades

Basic Mechanical Grades

Spirafort® series
EN 10297, EN 10210

E355, S355J2H,
Grade B, C, ...

V & M TUBES for standard grades

Bulkerton® series
EN 10297, EN 10210

E355, S355J2H,
Grade B, C, ...

Engineering Grades

Advanced Engineering Grades

Avadur® series
ASTM A 519

Offshore Grades

Oceanfit® series
API 5L, EN 10225

Case hardening steels
16MnCr5, C10E,
20NiCrMo2-2, ...

Basic Mechanical Grades

Unalloyed heat treatable steels
C35E, C45E, C60E,
Grade 1045, ...

Alloyed heat treatable steels
25CrMo4, 34CrMo4,
42CrMo4, Grade 4130,
Grade 4140, ...

Fine-Grain High-Strength Grades

FineXcel® series
Stahl-Eisenwerkstoffblätter

S460NLH, P690QL1, ...

Increasing technical requirements

V & M TUBES grade brands meet and in many cases surpass the requirements of the relevant standard grades. The respective compliance with the standard is clearly indicated in the material datasheets, orders and certificates.
MSH sections are available in the following standard materials:

- Non-alloyed structural steels: up to S355
- Normalised structural steels: up to S460

VALLOUREC & MANNESMANN TUBES complements the portfolio on standard grades which are currently available on the market for hot-rolled hollow sections by two V & M TUBES proprietary grade series offering unprecedented yield strength levels.

Forterior® features enhanced yield strength in the range of above 370 MPa up to about 650 MPa in conjunction with good weldability. Compared with basic grades, Forterior® allows for achieving considerable weight reductions while still guaranteeing the best structural performance, at minimum cost.

The FineXcell® series consists of fine-grain high-strength steels with nominal minimum yield strength in the range of above 500 MPa up to impressive levels of about 900 MPa. The extraordinary high yield strength, very good impact test values at extremely low temperatures and excellent weldability make them a cost-effective unique choice in the design of most critical mechanical applications such as e.g. cranes and other load carrying structures.
Hot-rolled MSH sections are quality products tested in accordance with EN 10210 and similar national or international standards. All tests are carried out on the finished product, so adherence both to the specified mechanical and technological characteristics of the materials as well as dimensional tolerances is ensured.

Offers for structural hollow sections must always be viewed with great care, especially when very thin walls are specified. For example, profiles complying with EN 10305-5 meet all requirements on dimensions but they can have sharp edges, which adversely affect the welding characteristics (see p. 14). And deliveries of profiles in compliance with grade A requirements do not require verification of mechanical properties. EN 10305-5 takes these reduced quality features into account in item 8.5.4. of its technical delivery conditions as follows: “The static and dynamic properties of square and rectangular tubes with sharp corners cannot always be achieved.”

Our quality management system has been approved for many years in accordance with national and international standards and specifications (e.g. ISO 9001). MSH sections in steel grades compliant with EN 10210-1 and intended for construction projects subject to German building supervision requirements are of course supplied together with the necessary verification of compliance (CE-sign). For special applications, e.g. in the ship-building and offshore industries, third-party acceptance by an organisation such as Technischer Überwachungsverein (TÜV) or Lloyd’s Register of Shipping (LRS), can be arranged (according to offshore standard EN 10225).
**Aesthetics**

**MSH sections – Clear, smooth lines for elegant structures**

In modern architecture, hot-rolled MSH sections are frequently used for exposed construction components. Their high load capacity permits the type of slender structures that architects are seeking for light-weight, elegant design solutions. This applies, in particular, to modern steel-glass architecture that aims at minimising the dimensions of the actual supporting structure. Varying loads can be handled by using a section of the same outside diameter but with a different wall thickness, resulting in a uniform, harmonious overall appearance. For example, columns of constant outside diameter can be constructed through many storeys. This offers the combined advantage of visual appeal and cost-effectiveness, because all joints and connections can be made using the same design and technique. Modern production equipment and new steel grades optimised for hot-rolling give MSH sections a smooth surface finish that compares favourably with other profiles. In addition, the appearance of structures made of MSH sections is not impaired by a weld – which can be an eyesore with other hollow sections, especially when the construction is given a gleaming coat of paint. The attractive advantages of MSH sections can be seen in a large number of award-winning buildings and constructions.
MSH sections – Higher static values for increased loadability in all applications

The two manufacturing processes hot-rolling and cold-forming result in different corner radii. Accordingly, the cross-sectional area and static values of hot and cold-formed hollow sections vary significantly. This is another reason why the two are described in different standards, namely hot sections in EN 10210 and cold sections in EN 10219.

Because hot-rolled hollow sections have smaller corner radii, they generally also have a larger cross-sectional area than cold-formed hollow sections. This advantage of MSH sections becomes more significant with greater wall thicknesses. In practice, this means that MSH sections can take much higher loads than cold-formed hollow sections of the same size. In other words, their use results in a higher safety level.
Buckling loads

**MSH sections – Assigned the best buckling curve**

Their favourable static values make hollow sections particularly suitable for structural elements subject to buckling loads (columns, compression members in trusses and frames). The different properties of hot and cold-formed hollow sections are reflected in the design rules for compression members. European steel construction standards (e.g. EN 1993-1-1, Tab. 6.2) generally assign a more favourable buckling curve to hot-rolled hollow sections than to cold-formed sections.

As part of the preparations for the new European steel construction standard (Eurocode 3), the manufacturers of cold-formed hollow sections initiated a research project. The objective was to achieve assignment of their hollow sections to a more favourable buckling curve. This project, sponsored by CIDECT (Comité International pour le Développement et l’Étude de la Construction Tubulaire – International Committee for the Development and Study of Tubular Structures) and conducted at the Universities of Aachen and Liège, focused on cold-formed hollow sections of the “new generation”. These are defined as hollow sections made from new and improved steel grades and using modernised rolling mills. The result came as a disappointment to the manufacturers of cold-formed hollow sections. Instead of achieving the desired allocation to the more favourable buckling curve a, they had to accept a downgrade. In future, cold-formed hollow sections will generally be assigned to the lower buckling curve c. The diagram shown below from the final project report compares the test results with buckling curve c.

The report says: “The diagram shows that buckling curve c of Eurocode 3 provides a satisfactory description of the actual buckling behaviour, although it overestimates the actual buckling behaviour observed in the test specimens. Statistical analysis of these tests yields a part safety coefficient of $\gamma^*_M = 1.15$, which coincides well with the value $\gamma^*_M = 1.1$ required by Eurocode 3.”

1 Cidect Research Programme 2 R: Buckling Behaviour of a New Generation of Cold-Formed Hollow Sections, Final Report 1996

**Eurocode 3 – Buckling Curve c**

\[ N = \frac{N_{\text{req}}}{A \cdot f_y} \]
Another research project was much more successful. It investigated the buckling behaviour of hot-rolled hollow sections in the high-strength material S460\(^2\). As a result of this project, these hollow sections can now be assigned to the best buckling curve, \(a_0\).

The new Eurocode \(^3\) classifies the various cross sections in its Table 6.2. Above is an excerpt of this table.

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\(^2\) CIDECT Research Programme 2 T: Buckling Behaviour of Hot-Rolled SHS in High-Strength Steel Grade S460, Final Report 1999

\(^3\) EN 1993-1-1:2010-12, Table 6.2
The diagrams below illustrate the practical effects by comparing the buckling loads on 3,000 mm columns of hot-rolled and cold-formed hollow sections:

- **Manufacturing process**: Buckling curve
  - S235, S275, S355, S420, S460
  - **Hot-forming**
  - **Cold-forming**

- **Curve a** values are up to 27% higher than curve c, curve a₀ values even up to 36%.

- **Buckling coefficient**
  - Sturdy: 1.0
  - Medium: 0.8
  - Slender: 0.6
  - 0.4
  - 0.2
  - 0

- **Buckling curve**: Hot: a (S355), a₀ (S460)
  - Cold: c

- **Comparison**: 100 x 100 x 10 mm in S355 vs. S460 buckling length 3,000 mm
  - S355: 100 %, 136 %, 133 %, 133 %, 136 %, 150 %
  - S460: 100 %, 136 %, 133 %, 133 %, 136 %, 150 %

- **Design load**: 500 kN
  - **Cold-formed** profile: 100 x 100 x 10 mm
    - Max. load: 506 kN
    - Weight: 76.7 kg (≈ 126 %)
  - **MSH section**: 100 x 100 x 7.1 mm
    - Max. load: 531 kN
    - Weight: 60.8 kg (≈ 100 %)

- **Dimensioning example**: column (3,000 mm)
**Weldability**

**MSH sections – Problem-free welding – even in the corner zones**

The differences in the mechanical and technological properties of hot-rolled and cold-formed hollow sections become particularly obvious when it comes to welding. Cold working is a major factor governing the risk of brittle fracture. The relevant welding specifications therefore not only include recommendations regarding groups of suitable steel grades for specific degrees of deformation but also clearly state the conditions under which welding is at all permitted in the cold-formed areas.

The new European steel construction standard, EN 1993 (EC 3)\(^4\), defines the conditions and parameters for welding cold-formed areas and adjacent zones. The values have been adopted from the EN 1993-1-8, Tab. 4.2. The critical parameter in this context is the ratio between the inner corner radius and the wall thickness \((r/t)\). The table below compares the values for this parameter according to EC 3 and EN 10219:

<table>
<thead>
<tr>
<th>Wall thickness range in mm</th>
<th>(r/t) value required by EC 3(^4) to allow welding</th>
<th>Actual (r/t) value as per production standard EN 10219-2(^5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\leq 4)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>(4 &lt; t \leq 6)</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>(6 &lt; t \leq 8)</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>(8 &lt; t \leq 10)</td>
<td>2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>(10 &lt; t \leq 12)</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>(12 &lt; t \leq 24)</td>
<td>3.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

For the wall thickness ranges marked in bold, the ratio between the inner corner radius and the wall thickness according to the production standard EN 10219-2 is so small that the welding of cold-formed hollow sections is not permissible according to EC 3.

The table below compares the corner radius required according to EC 3 with the relevant dimension according to EN 10219:

<table>
<thead>
<tr>
<th>Wall thickness in mm</th>
<th>Inner corner radius required by EC 3 in mm</th>
<th>Actual inner corner radius as per EN 10219-2 in mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.0</td>
<td>7.5</td>
<td>5.0</td>
</tr>
<tr>
<td>10.0</td>
<td>20.0</td>
<td>15.0</td>
</tr>
<tr>
<td>12.5</td>
<td>37.5</td>
<td>25.0</td>
</tr>
</tbody>
</table>

\(^4\) EN 1993-1-8:2010-12, Table 4.14; \(^5\) EN 10219-2:2006, Appendix B.3
The examples prove that the welding conditions of Eurocode 3 cannot be maintained for a large proportion of wall-thickness ranges in cold-formed hollow sections manufactured in accordance with EN 10219-2.

No confirmations given by manufacturers or stockists can obscure this fact, as the applicable standard cannot be invalidated. Because welding is not allowed in the adjacent zones (5 x t) either, merely an area of just 30 mm (60 mm) in the centre of a cold-formed hollow section 100 x 100 x 5 mm (200 x 200 x 10 mm) remains available for welding in line with Eurocode 3. This is entirely inadequate for the purposes of steel construction (see adjacent drawing).

This sort of limitation does not exist for MSH sections: because they are hot-rolled, their entire cross-sections – including the corners – are weldable without difficulties of any kind.
MSH sections – Always on the safe side

Perfection – precision – safety. Whether for buildings, bridges or cranes – this is the set of demands according to which design and engineering concepts are developed and implemented today, with ever-increasing importance being attached to safety aspects.

In this extremely sensitive area, the advantages of hot-rolled hollow sections are particularly evident. The Deutsche Bahn (German railways), for example, as well as crane and cableway manufacturers and builders, have internal standards (e.g. BN 918 002) and specifications that explicitly stipulate the use of hot-rolled hollow sections. Similarly, where Eurocode requirements are mandatory, there is no alternative in most cases to hot-rolled hollow sections (see section “Weldability”).

These safety specifications are based on the different properties of hot and cold-formed hollow sections, as shown below in terms of hardness distribution and residual stresses.

While a hot-rolled MSH section exhibits uniform hardness distribution around its perimeter, a cold-formed section shows significant hardness peaks in the corner zones. This indicates that inhomogeneous strength properties have to be expected here. Another hardness peak can be found in the area of the longitudinal weld, which allows the conclusion to be drawn that the weld in this case has not been heat treated. The occasionally suggested idea that the increased strength in the corner zones of cold-formed profiles could be utilized for design purposes is problematic – and in many cases ruled out by the applicable standards – due to the inestimable risk this would involve.

With residual stress distribution, conditions are very similar to hardness distribution. While hot-rolled MSH sections show uniform residual stresses at an extremely low level through the cross section, cold-formed hollow sections exhibit high residual tensile stresses. The adjacent drawings provide impressive evidence of this.
Longitudinal residual stress distribution in cold and hot-rolled sections of S235 (in N/mm²)

Transverse residual stress distribution (in N/mm²) in cold-formed (a) and (b) hot-rolled sections 60 x 60 x 4 mm

During the processing of such sections (e.g. welding or galvanizing) these residual stresses can be released and cause uncontrollable distortion in the section or in the entire construction. Straightening this out can be an extremely complex and costly procedure.
Brittle fracture is a major concern among steel construction architects and design engineers. This cleavage-type fracture is particularly dangerous because it occurs suddenly without warning and even under loads far below the permissible stress level.

The risk of brittle fracture increases along with the cold hardening rate. An important gauge for a material’s tendency to brittle fracture is notch toughness because it is also affected by the cold hardening rate. As a rule, the ductile-to-brittle transition temperature is shifted by 3-5 °C to the unfavourable side for each percentage point of cold deformation. With cold-formed hollow sections, the degree of cold deformation is in the area of 20–30 % (in extreme cases even 43 %), so the shift in the transition temperature is quite considerable.

This also emerges from a joint research project carried out between the Universities of Toronto, Canada and Karlsruhe, Germany. The diagram on the right, which was taken from the project report, clearly shows the differences between hot-rolled and cold-formed hollow sections. The results plotted here represent the specimen position and orientation that provided the highest values. The investigations clearly show that the tendency to brittle fracture at low temperatures is much lower in hot-rolled hollow sections.

These research results led to the recommendation that hot-rolled hollow sections exclusively should be used in dynamically loaded structures where toughness in all specimen positions and orientations is a criterion. The American standard for cold-formed hollow sections, ASTM A 500 expresssly points out in a foot note that these sections may be unsuitable for dynamically loaded structures exposed to low temperatures.
"Note 1 – Products manufactured to this specification may not be suitable for those applications such as dynamically loaded elements in welded structures, etc., where low-temperature notch-toughness properties may be important."

The American Welding Society supplements this footnote in the 2002 edition of its AWS Recommendations as follows:

"Special investigation or heat treatment may be required if this product is applied to tubular T-, Y-, and K-connections."

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7 ASTM A 500: Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes, Edition 2010a

The differences described clearly show that the steel’s residual ductility is largely used up by the enormous cold deformation rates (up to 43 %), and there is a high risk that failure may occur not in the form of a slow-growing incipient crack but as sudden, fast fracture without warning.

This risk does not exist for hot-rolled MSH sections. In other words: you are always on the safe side with hot-rolled MSH sections.
MSH sections – Unique benefits through extra-tight corner radii (Ra ≤ 1 · T) resulting in large, flat connecting areas

Hot-rolled MSH sections also offer considerable advantages when it comes to processing and fabrication.

The special developments in our hot-rolling process allow V & M TUBES to create extra-tight corner radii (Ra ≤ 1 · T) which do not lead tangentially into the side faces but form a clean edge (see also section “Static values”). This also represents an excellent weld preparation and reduces the amount of welding material required. V & M TUBES thus offers a further unique MSH product feature that far surpasses the requirements of EN 10210-2 in terms of the maximum permissible value (Ra ≤ 3 · T).

The large flat connecting surfaces (see adjacent drawings) resulting from these extra-tight corner radii simplify the adjustment of structural or assembly parts and support full utilization of the MSH sections’ strength benefits further detailed in this brochure.
Cost-effectiveness

MSH sections – The proof is in the bottom line

Needless to say, a construction project’s cost-effectiveness is among its most decisive criteria. An appealing and safe design solution must also be tenable from an economic viewpoint. Cost-effectiveness in this respect is much more than the sum total of the prices of the individual elements: it is the interaction of many factors. Compared to other design solutions, the creation of an MSH structure – exploiting all the advantages specific to hot-rolled MSH sections – can be highly cost-effective:

- Reduced cross-section, wall thickness and thus deadweight, through the selection of the best-suited material.
- Uniform connections and joints in columns, beams and girders, because the outer dimension can be kept constant all along.
- Truss-work can be planned with greater distances between joints, thanks to the outstanding static characteristics of MSH sections. As a result, fewer joints are required in all.
- Easy, cost-effective processing (e.g. straight, flat cuts that frequently render weld preparation unnecessary, simple fillet welds).
- Small weld volume in circular sections, because a smaller outside diameter and wall thickness can be selected.
- Small weld volume in square and rectangular sections thanks to their small corner radii.
- Savings in paint coating and corrosion protection costs, thanks to the smaller surfaces of MSH sections.
- Option to increase the load capacity of columns by filling the hollow cross-section with concrete.
- Option to fill the hollow cross-section of columns with concrete or water, so they can serve for as fire protection.
- Option to install supply lines (e.g. for air conditioning, electricity or water) in the hollow cross-sections.

As can be seen, cost-effectiveness is not governed by the price per tonne of hollow sections alone, but by the result in the bottom line. And this speaks volumes for the MSH section!
Apart from supplying a top-quality product, VALLOUREC & MANNESMANN TUBES specialists will be happy to provide you with first-class advice on the application of MSH sections. This service is available not only to the stockists and traders among our customers but also to end users. For example, we hold special MSH seminars where your specific questions and requirements will be addressed and dealt with in detail.

The MSH team can also support and assist you in the planning and completion of your project, and not just where technical questions are concerned. A special project team will take care of your order and ensure its smooth handling in line with your project schedule.

V & M TUBES has published a wide selection of technical brochures and leaflets on MSH sections in which the most varied questions regarding dimensioning, design and manufacture are dealt with in great detail. Beyond that two new V & M TUBES publications make the design of hollow section joints much easier. The printed Design Tools for Hollow Section Joints include tables of standard joint types for a wide range of hollow section sizes. The CoP software tool takes engineers through an interactive process during which individually designed joints are provided with a static analysis ready for verification in compliance with Eurocode 3.

You can order or download this information as well as our “Stacom” software programme (with static values and buckling loads for MSH sections) from our homepage at www.vmtubes.com/msh

We have been a member of CIDECT (Comité International pour le Développement et l’Étude de la Construction Tubulaire – International Committee for the Development and Study of Tubular Structures) for decades. During this time we have decisively influenced and promoted further development in the sector of structural hollow sections. The findings gained in the course of this work have been published in a large number of CIDECT design guides (www.cidect.org). The international contacts established in this close cooperation with associations, universities and research centres are helpful in the implementation of unusual approaches and concepts.

So do not hesitate to contact us should you have any questions regarding MSH sections. Just ring us, or send a fax or an e-mail. For further product information as well as contacts complete with addresses and telephone numbers, visit our homepage at www.vmtubes.com/msh

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